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NASA Administrator Bolden to Hold All-Hands with Marshall Team March 14

NASA Administrator Charles Bolden will hold an all-hands meeting with NASA Marshall Space Flight Center team members at 10:45 a.m. March 14 in Building 4200, Morris Auditorium.

Along with remarks from Bolden, Marshall Center Engineering Directorate Manager Chris Singer

and Space Launch System (SLS) Program Manager Todd May will provide an overview on the center's accomplishments. Team members will have the opportunity to ask questions.

The all hands will be broadcast live on Marshall centerwide TV and streamed to desktop TV.

Marshall's Teresa Vanhooser Followed Her Passion to NASA

By Bill Hubscher

Growing up in Johnson City, Tenn., Teresa Vanhooser wasn't entirely sure which direction she wanted her career to take, but she knew it wasn't going to be in the family business.

"My family has run a jewelry store there since 1927," said Vanhooser, deputy director of the Marshall Space Flight Center. "It is an institution in my hometown, and, while I love jewelry, I just didn't feel led to pursue the family business."

What she had a passion for was math, and a conversation with



A multi-generational picture of Teresa Vanhooser, center, deputy director of the Marshall Space Flight Center, with her father Denny Bowman and her grandmother Janelle Bowman, soon after Vanhooser's eldest daughter Heather was born in 1988. Janelle Bowman was an inspiration to Teresa while she was growing up in Johnson City, Tenn. (Photo courtesy of Teresa Vanhooser)

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Mini Rocket Models to be Used in a Big Way for SLS Base Heating Test

By Megan Davidson

To better understand the heating conditions at the base of what will be the biggest, most powerful rocket ever built, engineers at NASA's Marshall Space Flight Center are thinking small -- really small.

Models of NASA's Space Launch System (SLS) [core stage](#) RS-25 engines and solid rocket boosters -- scaled down to just 2 percent of the actual size of the flight hardware -- have been designed, built and hot-fire tested at sea-level conditions. The tests are part of the Pathfinder Test Program, which is run by Marshall engineers in close collaboration with Calspan-University of Buffalo Research Center Inc., in Buffalo, N.Y. The SLS core stage, towering more than 200 feet tall with a diameter of 27.6

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A size comparison of the booster and engine nozzles to a quarter. (NASA/MSFC)

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her uncle -- who worked for the Tennessee Valley Authority -- while she was in high school led her to an engineering career that has culminated in a managerial role at one of NASA's larger centers.

Even though that conversation was a career touchstone, it was the matriarch of young Teresa's family who has been a life-long inspiration.

"My grandfather passed away at a young age, leaving my grandmother to raise six children while successfully turning a watch-making business into a jewelry business," Vanhooser said. "She did all that with an eighth grade education. My grandmother was a strong woman who taught all her children and grandkids that strength and ways to balance work and family. She is a personal hero who influenced me in so many ways."

Vanhooser recently discussed her NASA experiences with Marshall Television as part of Women's History Month. She shared the path she took to Marshall get here, being the lone female engineer in her branch when she started at NASA, and how she wants to help young people develop their careers. Her video profile is posted at the [Marshall Center's YouTube channel](#).

Hubscher, an ASRC Federal/Analytical Services employee, supports the Office of Strategic Analysis & Communications.

'Table Talks with Teresa': Team Members to Chat with Marshall Center Deputy Director

Have a question you want answered by Marshall Center Deputy Director Teresa Vanhooser?

Come and ask it at "Table Talks with Teresa" on March 18, from 1-2 p.m. in Building 4600, room 4013. The featured topic will be "If I Only Had a Mentor: Why Mentorship Matters." Vanhooser, along with Audrey Robinson, center chief counsel; and Preston Jones, deputy director of the Engineering Directorate, will discuss and answer questions about the importance of mentorship.

"Table Talks with Teresa" is an open forum for Marshall team members to chat with the deputy director about various topics of interest. Sessions are being held every other month during 2014 at different locations around the center. A special topic is featured to begin the conversation, however attendees are encouraged to use the hour to talk with Vanhooser about any topic or ask questions.

Feel free to come and ask a question about mentorship or other topics at the Table Talks session March 18. Sessions are not limited to the featured topic.

Check for up-to-date information about upcoming Table Talks with Teresa [here](#).

Mini Rockets *Continued from page 2*

feet, will store the cryogenic liquid hydrogen and liquid oxygen that will feed the vehicle's RS-25 engines.

The replicas will help engineers in a huge way by providing data on the convective heating environments that the base of the vehicle will experience during ascent. The models were developed for base heating testing scheduled for this summer.

Data from those tests will be used to set specifications for the design of the rocket's base thermal protection system, which keeps major hardware such as wiring, and later the crew, safe from the extreme heat the boosters and engines create while burning on ascent.

So why use mini rocket engines?

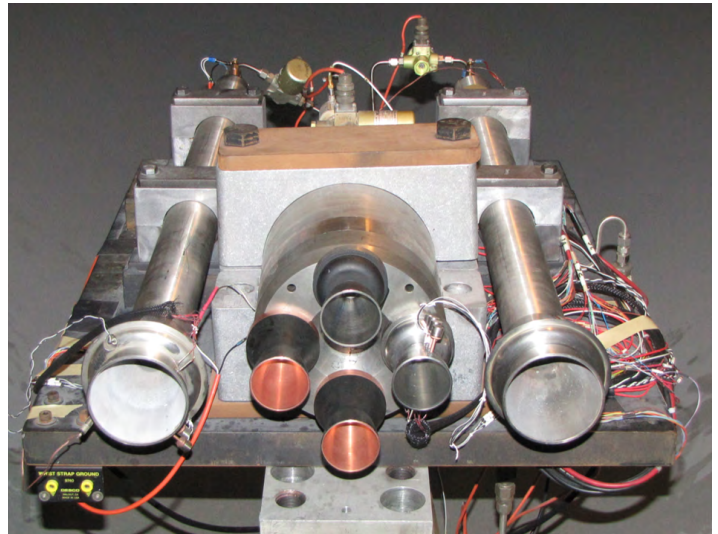
"Using scale models of the SLS core stage engines and boosters are not only cost-effective but also can fit in a wind tunnel," said Manish Mehta, lead engineer for the SLS Base Heating Test Program. "Wind tunnel testing is one of the most proven ways to adequately simulate the pressure and heating an actual rocket will experience during ascent. We had to make sure these models achieve aerodynamic and rocket plume similarity with the real flight vehicle as close as possible."

Base heating test models date back to the Saturn and Space Shuttle programs. However, the last major hot fire model design effort for a NASA launch vehicle was for the shuttle in the late 1970s.

"This type of testing is not business as usual," said Mark Seaford, a Marshall engineer who works on the test project. "We had to go back and review the old shuttle model drawings and design rules of thumb as a starting point. Young engineers on our team took those past practices and came up with innovative approaches to designing and testing these models."

"It was really exciting to see the energy generated by this team and getting the opportunity to do something dynamic and challenging," Seaford added.

Mehta said some of those challenges were to develop the engines and motors for short-duration testing -- with test-run times around 150 milliseconds. The team also used new engineering materials and design tools, including computational fluid dynamics -- numerical codes used to predict internal flow behavior in the engine.



Two-percent scale models of the Space Launch System (SLS) solid rocket boosters and core stage RS-25 engines, which will power the vehicle to deep space missions, have been designed and built ahead of base heating testing scheduled this summer. The current model RS-25 engine clocking configuration, different from the SLS configuration, is used to adequately visualize plumes during the Pathfinder Test Program. (NASA/MSFC)

"Without computational fluid dynamics, we'd be blind," Mehta said. "The codes were extremely crucial in determining the design of these rocket engine models. Our team numerically investigated several different design iterations until all performance requirements were satisfied for a final design."

"We also had the opportunity to use high-speed, high-resolution visible and infrared cameras -- technology that wasn't available on past programs," Mehta added. "The visible video camera alone -- almost 500 times faster than a regular camera -- was integral in verifying the design and similarity to the actual flight plumes."

The models, which took about a year and a half to design and build to flight specifications and performance, were fabricated and tested at Calspan-University of Buffalo Research Center Inc. A 2-percent scale model of the entire SLS, about 6.5-feet long, is currently being designed at that facility ahead of the final complete vehicle base heating test this summer.

To watch a video of the core stage engine models undergoing a hot-fire test, click [here](#).

Davidson, an ASRC Federal/Analytical Services employee, supports the Office of Strategic Analysis & Communications.

Data Operations Control Room is 'Air Traffic Controller' of Payload Operations Integration Center

By Jessica Eagan

On a typical day aboard the International Space Station, numerous science investigations take place. Astronauts follow procedures directed by researchers back on Earth.

And since March 8, 2001, NASA's Payload Operations Integration Center (POIC) team members at the Marshall Space Flight Center have planned and coordinated all the research activities aboard the space station. They help the crew and investigators around the world perform science more efficiently.

But back up. Before that can even happen, how can a responsibility this big be made possible?

A room on the first floor of the Huntsville Operations Support Center in Building 4663 is filled with a dedicated team whose primary purpose is to provide ground support for the POIC, the heartbeat for space station science operations. The Data Operations Control Room is called "home" to a group of 19 people, many who have been there since the beginning of Spacelab and space shuttle days in the 1980s. There, these diligent employees work in three shifts -- swing, midnight and day -- to take in science data from the space station, and distribute it to the POIC and researchers all over the world who have experiments on the orbiting laboratory.

"The data control room team is the tip of the spear when it comes to ensuring the integrity of systems and services like commanding, voice, and data distribution," said Sparky Goodman, the Huntsville Operations Support Center contractor ground systems manager at Marshall who oversees the data control room. "They are the ones who are making science available to support station. The station science community depends on us -- the POIC team, remote users, universities, colleges and international partners."

But their responsibility doesn't stop there. Whenever technology such as computers, hardware, video, telemetry and voice loops -- used to communicate with the crew and scientists -- goes down in the POIC, a call to the help desk or over the loops to the data control room is in order.

Added Goodman: "I use this analogy whenever we start



Data Operations Control Room team members take all science data from the International Space Station, and distribute it to the Payload Operations Integration Center employees and scientists around the world who have experiments on the orbiting laboratory. (NASA/MSFC/Fred Deaton)

interviewing people for a position in the data room: Our controllers are like soldiers in foxholes. When the bullets are flying, they've got to know how to immediately recover systems and services. That's crucial."

It takes from a year to 18 months to train a new employee because everyone needs to be familiar with all positions in the data control room due to its collaborative environment. Calls from users who need assistance come over the speakers, and everyone works together as a team to resolve issues.

The swing shift is responsible for configuring all the systems for the next day's activities. While a lot of Marshall employees are asleep, the midnight staff is working, checking out systems to make sure they are functioning correctly. The day shift follows, responsible for executing simulation, test and flight activities.

It's a 24/7, 365-days-a-year responsibility with no holidays off ever -- Christmas included.

Even when a snowstorm hit Huntsville and surrounding areas in February, forcing Redstone Arsenal to shut down, data control room team members were still making their way through the gates and into work, as required.

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Marshall James Webb Telescope Test Team Earns Space Flight Awareness Award for Space Telescope Mirror Assembly Tests

By Kenneth Kesner

For more than five years, despite government shutdowns and natural disasters, the X-ray & Cryogenic Facility James Webb Telescope Test Team at NASA's Marshall Space Flight Center has executed its mission, keeping the next, great space-based observatory on track for a 2018 launch.

"You guys have done a fabulous job," said NASA Associate Administrator Robert Lightfoot, presenting team members with the agency's Space Flight Awareness Awards during ceremonies Feb. 25.

The Marshall facility is one of the only places in the world where large components like the mirrors and graphite wings of the Webb telescope can be tested in a simulated space environment. Those tests are particularly important to the Webb instrument, which is 100 times more powerful than the Hubble Space Telescope and will operate farther from Earth, making any repair missions unlikely.

Lightfoot was Marshall's center director when tornadoes ripped through Alabama April 27, 2011, killing 247 people, destroying thousands of homes and causing a nearly week-long power outage in the northern region of the state. He remembers how, as Redstone Arsenal and the Marshall Center re-opened with partial power, the telescope test team reported for work at the facility even as they and their families dealt with the storms' aftermath. They had doors open and fans blowing to keep equipment cool as full power was restored, ensuring that mirror verification and other tests weren't lost, and that the Marshall Center would meet its commitment to the



Eric Smith, left, acting program manager for the James Webb Space Telescope at NASA Headquarters, talks with NASA Associate Administrator Robert Lightfoot, right; Jeff Kegley, manager of the X-ray and Cryogenic Facility at Marshall; and Helen Cole, project manager for the Webb Telescope test activities at Marshall. Lightfoot presented Space Flight Awareness awards to Marshall's Webb Telescope test team during ceremonies at the facility Feb. 25. (NASA/MSFC/Kenneth Kesner)

project. Work on the final component to undergo testing at Marshall -- the telescope's primary mirror backplane support structure -- was completed in November 2013.

Lightfoot said the team members' dedication -- also evident in the way they work with customers to solve problems that crop up, and in the way they transport and handle irreplaceable test articles -- is why the Marshall team has been the top choice for work on the Chandra X-ray Observatory, Hubble

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"Some of us live 50-60 miles from here," said Hank Creel, operations support team lead. "But we never missed a beat. At least two people are here all of the time -- no matter what."

In the event of severe weather, the team members do not evacuate, but remain in the data control room -- a protective area. It is stocked with food and water in case there's an emergency situation, such as the April 2012

tornadoes.

"I can't say how much I appreciate the dedication of my team," said Creel. "It's an honor to work alongside them. They're good folks."

Eagan, an ASRC Federal/Analytical Services employee, supports the Office of Strategic Analysis & Communications.

National Geographic Live TV Show Takes Viewers Onboard the International Space Station

On March 14, at 7 p.m. CDT, the National Geographic Channel will broadcast live scenes from the International Space Station (ISS) during a two-hour television show called “Live From Space.” Astronaut Mike Massimino and news anchor Soledad O’Brien will host the show from the station’s Mission Control Center at NASA’s Johnson Space Center.

National Geographic produced segments of the show in collaboration with NASA, including segments filmed by station astronauts Rich Mastracchio and Koichi Wakata. During the show, Mastracchio and Wakata will give viewers a tour of their home in space and demonstrate how they conduct science onboard the orbital outpost. Some segments were filmed as the crew worked on science experiments with the team in the Payload Operations Integration Center -- NASA’s control center for science on the station -- at NASA’s Marshall Space Flight Center.

On Twitter, viewers can say hi to the [@NASA](#) astronauts appearing on [#LiveFromSpace](#) with your [#HelloFromEarth](#) selfie. Take a look at this [ISS selfie](#) to kick things off. You can follow Rick Mastracchio on Twitter at [@AstroRM](#) and Koichi Wakata [@Astro_Wakata](#).



The National Geographic Channel documentary crew films Shaun Glasgow, a payload operation director, and the team working in the Payload Operations Integration Center -- NASA’s 24/7 control room for space station science. (NASA/MSFC/Jessica Eagan)

For more information about the show, visit [here](#) or follow on Twitter [@SpaceLive](#).

To learn more about the International Space Station, visit [here](#) or [@ISS_Research](#) on Twitter.

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Space Telescope and other space-based instruments.

“Isn’t it interesting that nearly all of NASA’s ‘Great Observatories’ have come through Marshall Space Flight Center?” Lightfoot said. “It’s not the mirrors. It’s the people. I really appreciate what you’ve done.”

Eric Smith, acting program director for the James Webb Space Telescope at NASA Headquarters, told the team that the astronomical world knows this: If you want to continue down the road of discovery to peer at the edge of the cosmos, that road runs through Huntsville.

“Years from now, when astronomers are using the telescope, I hope that you feel a great sense of ownership for those discoveries,” he said.

Jeff Kegley, manager of the X-ray and Cryogenic

Facility, said when people tour the facility, they always tell him how great it is. “But what our customers tell me is the team is what makes this place special,” he said. “Some say they’d rather have their testing done here than anywhere else.”

Helen Cole agrees. She’s project manager for the James Webb Telescope test activities at Marshall, and she’s seen over and over again how the civil servants and contractors create common goals and find opportunities for joint solutions.

“I think this is the benchmark test team in the agency,” Cole said.

Kesner, an ASRC Federal/Analytical Services employee, supports the Office of Strategic Analysis & Communications.